

**NARROW BANDWIDTH, PICO-SECOND, OPTICAL PARAMETRIC OSCILLATOR-
MASTER OSCILLATOR POWER AMPLIFIER SYSTEM AND METHOD OF
OPERATION OF SAME**

5

Abstract of the Disclosure

A synchronously pumped optical parametric oscillator generates pulses with duration 25 ps and repetition rate of 10 Hz. The bandwidth of the radiation is 1.36 cm^{-1} , close to the Fourier limit. A single pulse from each oscillator is further amplified with an optical parametric amplifier obtaining pulse energies up to 3.7 mJ. This source can be tuned between 410 nm - 2000 nm. The system is not a laser but an optical parametric oscillator where amplification is obtained in a parametric process rather than by population inversion. The oscillator is pumped by a pulse train from a Nd:Yag laser. In each roundtrip the bandwidth of the radiation is reduced by a grating-mirror assembly. After a number of roundtrips a close to ideal pulse is obtained. This single pulse is then amplified by an optical parametric amplifier obtaining a single tunable narrow bandwidth pulse with a duration of about 25 ps.

10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100